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ГОСУДАРСТВЕННЫЙ КОМИТЕТ ПО ИЗОБРЕТЕНИЯМ И ОТКРЫТИЯМ ПРИ ГКНТ СССР

ОПИСАНИЕ ИЗОБРЕТЕНИЯ

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Авторское свидетельство СССР № 1591557, кл. Е 21 В 29/10, 1988.

(54) УСТРОЙСТВО ДЛЯ РЕМОНТА ОБСАДНОЙ КОЛОННЫ ТРУБ В СКВАЖИНЕ

(57) Изобретение относится к нефтедобывающей промышленности и предназначено для бурения и эксплуатации водяных, нефтяных и газовых скважин. Цель – повышение надежности устройства в работе за счет обеспечения возможности взаимодействия пластыря с упорным патрубком на всем цикле установки пластыря. Для этого упорный патрубок имеет длину не менее длины пластыря. Патрубок содержит узел фиксации, выполненный в виде расположенного в нижней полости корпуса сектора с зубчатой насечкой, секторов с зубчатой насечкой, расположенных в продольной плоскости на наружной поверхности полого штока на расстояниях один от другого, равных рабочему ходу поршней полого штока, и расположенных на упорном патрубке секторов с зубчатой насечкой. Один сектор с зубчатой насечкой расположен на внутренней поверхности в верхней части упорного патрубка с возможностью фиксации на секторах полого штока при рабочем ходе последнего. Остальные секторы упорного патрубка расположены на наружной поверхности последнего последовательно в продольной плоскости на расстояниях один от другого, равных рабочему ходу поршней полого штока, с возможностью поочередной фиксации на секторе корпуса при осевом перемещении последнего. Предлагаемое устройство обеспечивает установку пластыря в призабойной зоне и в обсадных колоннах малых типоразмеров. 4 ил.

Изобретение относится к нефтедобывающей промышленности, в частности к бурению и эксплуатации водяных, нефтяных и газовых скважин для установки металлических пластырей в скважинах с целью восстановления герметичности обсадных колонн, и может быть использовано для распрессовки пластырей в открытом стволе скважины с целью изоляции отдельных участков ствола при борьбе с обвалами, поглощениями, аномальными давлениями и т.д.

Целью изобретения является повышение надежности работы устройства путем обеспечения возможности взаимодействия пластыря с упорным патрубком на всем цикле установки пластыря.

На фиг. 1 представлено устройство в транспортном положении, общий вид; на фиг. 2 – то же, после первого хода силовых гидравлических цилиндров; на фиг. 3 – то же, после возврата силовых гидравлических цилиндров в первоначальное положение; на фиг. 4 – разрез А–А на фиг. 1.

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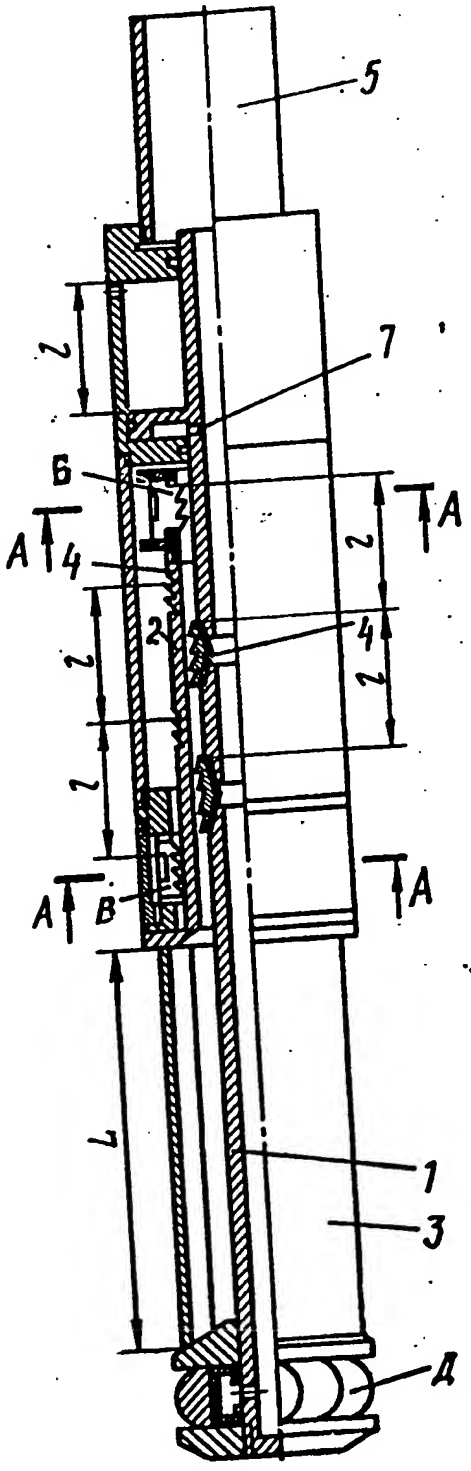
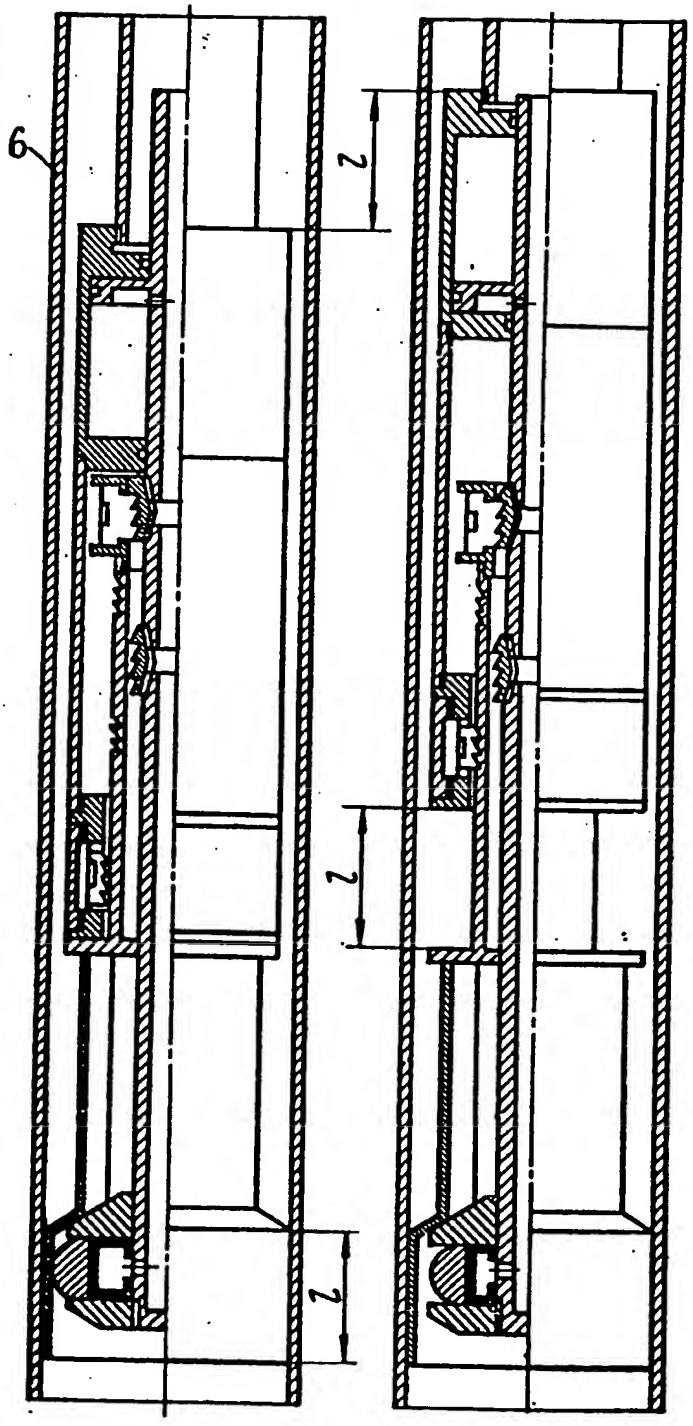
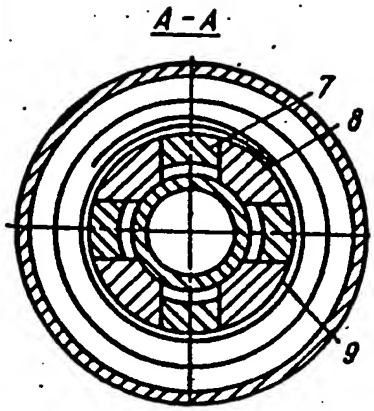
другого, равных рабочему ходу поршней полого штока с возможностью поочередной фиксации на секторе корпуса при осевом перемещении последнего.



Фиг. 1



Фиг. 2



Фиг. 4

Фиг. 3

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SPECIFICATION OF INVENTOR'S CERTIFICATE

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(71) All-Union Scientific-Research Institute of Well Casing and Drilling Muds
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(53) 622.245.4 (088.8)
(56) USSR Inventor's Certificate No. 961405, cl. E 21 B 29/00 (1978).
USSR Inventor's Certificate No. 1591557, cl. E 21 B 29/10 (1988).

(54) A DEVICE FOR DOWNHOLE REPAIR OF CASING

(57) The invention relates to the oil production industry and is designed for drilling and operation of water, oil, and gas wells. The aim is to improve the reliability of the device in operation by ensuring that the patch can engage the support sleeve over the entire patch placement cycle. For this purpose, the support sleeve has a length no less than the length of the patch. The sleeve contains a locking assembly, implemented as a toothed sector disposed in the lower cavity of the body, toothed sectors disposed in the longitudinal plane on the outer surface of a hollow rod with spacing between them equal to the working travel of the piston of the hollow rod, and toothed sectors disposed on the support sleeve. One toothed sector is disposed on the inner surface in the upper part of the support sleeve so that it can lock on to the sectors of the hollow rod during the working travel of the latter. The remaining sectors of the support sleeve are disposed successively on the outer surface of the latter in the longitudinal plane, spaced at a distance equal to the working travel of the piston of the hollow rod, so that they can successively lock onto the sector of the body during axial displacement of the latter. The proposed device makes possible placement of a patch in the critical zone and in small-bore casings. 4 drawings.

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The invention relates to the oil production industry, in particular to drilling and operation of water, oil, and gas wells for downhole placement of metal patches with the aim of restoring leaktightness of casings, and may be used for pressing patches in an open wellbore with the aim of isolating individual sections of the wellbore to control caving, lost circulation, pressure anomalies, etc.

The aim of the invention is to improve the reliability of operation of the device by ensuring that the patch can engage the support sleeve over the entire patch placement cycle.

Fig. 1 shows a general view of the device in the run-in position; Fig. 2 shows the same, after the first stroke of the heavy-duty hydraulic cylinders; Fig. 3 shows the same, after return of the heavy-duty hydraulic cylinders to the initial position; Fig. 4 shows the A—A section in Fig. 1.

The device for downhole repair of a casing (Fig. 1) consists of a hollow body with heavy-duty hydraulic cylinders mounted successively therein, hollow rod 1, telescopically mounted in the cavity of the body and with pistons that are disposed in the hydraulic cylinders, patch 3, coring head CH, support sleeve 2 which is telescopically mounted in the lower portion of the cavity of the body and has toothed sectors, one of which (B) is disposed on the inner surface in the upper part of the support sleeve and the remaining ones are disposed successively in the longitudinal plane on the outer surface of the support sleeve, with spacing at distances equal to the working travel of the piston of the hollow rod. The length of the support sleeve must be no less than the length of the patch.

The support sleeve has an assembly for locking it, implemented so that the support sleeve can alternately lock onto the body and the hollow rod, in the form of toothed sectors 4, disposed successively in the longitudinal plane on the outer surface of the hollow rod and spaced at distances l equal to the working travel of the piston of the hollow rod, for locking the support sleeve during the working stroke of the hollow rod, and toothed sector C, disposed in the lower part of the cavity of the body, to allow for successive engagement with the sectors of the support sleeve during axial displacement of the body.

The body of the device is secured in the upper part to work string 5 for lowering the device into string 6. Sectors B and C are disposed in windows 7 of races 8, freely move in the windows, and are compressed by flat spring 9.

The device operates as follows.

The device is lowered, on work string 5 made up from tubing, to the location of the damage to casing 6. After lowering to the specified depth, excess pressure is created in the device by a surface pumping unit. The working fluid is delivered through string 5 and channels 10 of the hollow rod to the pistons of the heavy-duty hydraulic cylinders.

The pistons of the hydraulic coring head begin to move, expanding patch 3 within length l, equal to the travel of the pistons of the heavy-duty hydraulic cylinders (Fig. 2), where sectors B of the support sleeve engage sectors 4, after which the pressure is released and string 5 is lifted to height l, the travel of the pistons of

the heavy-duty hydraulic cylinders (Fig. 3). Then support sleeve 2 remains in position, since it is locked by sectors C.

The device is ready to carry out the next work stroke with locking of the patch. The number of work strokes and accordingly the number of sectors 4, and also the number of sectors on the outer surface of support sleeve 2, are determined from the relationship

$$n = \frac{L}{l},$$

where n is the number of work strokes;

L is the length of the patch;

l is the travel of the pistons of the heavy-duty hydraulic cylinders.

The device makes it possible to place a patch in the critical zone and in small-bore casings (140 mm, 146 mm).

Claim

A device for downhole repair of casing, including a work string, a hollow body rigidly connected thereto with hydraulic cylinders mounted successively on the body, a hollow rod telescopically mounted in the body with pistons disposed in the hydraulic cylinders of the body, a support sleeve telescopically mounted in the lower part of the cavity of the body together with its locking assembly, said locking assembly being implemented so that the support sleeve can be alternately locked onto the body and the hollow rod, a hydraulic coring head disposed under the body and rigidly connected with the hollow rod, a patch mounted between the coring head and the support sleeve, *distinguished by the fact that*, with the aim of improving the reliability of operation of the device by making it possible for the patch to engage the support sleeve over the entire patch placement cycle, the support sleeve has a length no less than the length of the patch, and the locking assembly of the sleeve is implemented as a toothed sector on the outer surface that is disposed in the lower part of the cavity of the body, toothed sectors disposed in the longitudinal plane on the outer surface of the hollow rod and spaced at distances equal to the working travel of the pistons of the hollow rod, and toothed sectors disposed on the support sleeve, one of the latter being disposed on the inner surface in the upper part of the support sleeve so that it can lock onto sectors of the hollow rod during the work stroke of the latter, and the remaining sectors of the support sleeve being disposed successively on the outer surface of the latter in the longitudinal plane, spaced at distances

equal to the working travel of the pistons of the hollow rod and able to successively

lock onto the sector of the body during axial displacement of the latter.

[figure under columns 5 and 6]

[see Russian original for figure]

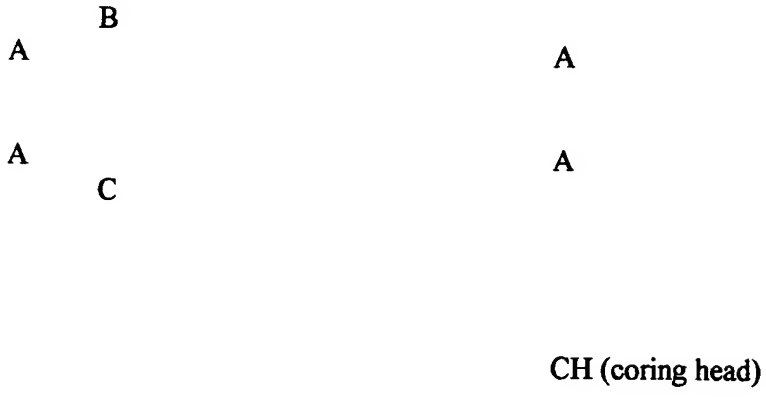

Fig. 1

[see Russian original for figure]

Fig. 2

[see Russian original for figure]

Fig. 3

[see Russian original for figure]

A—A

Fig. 4

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Sworn to before me this
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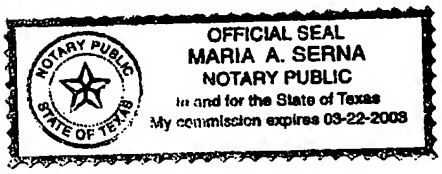

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